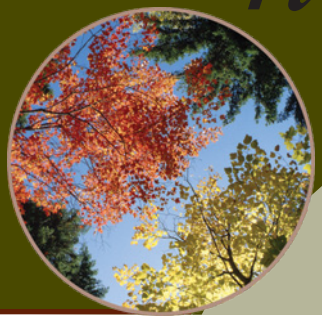
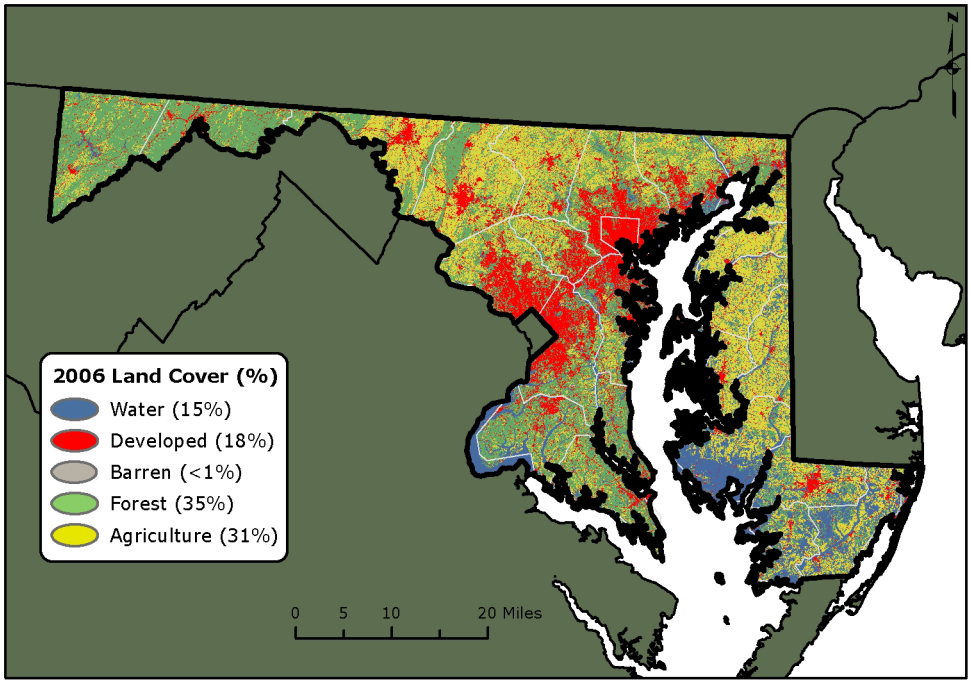
2011 Forest Health highlights

MARYLAND



The Resource

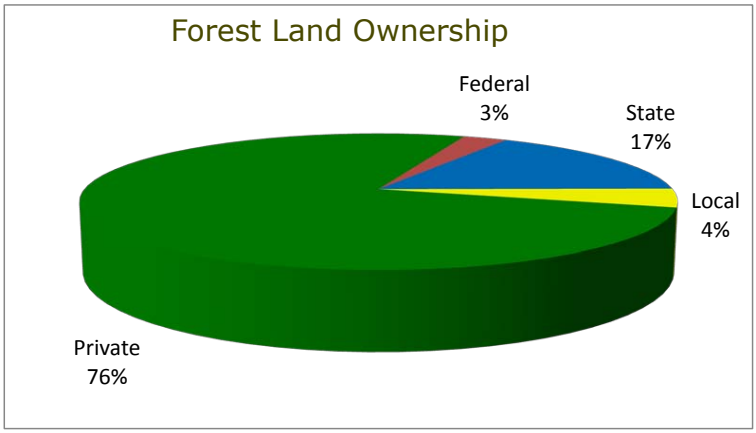
Maryland occupies a land area of 6,255,800 acres. Forest land comprises 2,565,800 acres, of which nearly 76 percent is privately owned. Healthy, productive forests are critical in urban and rural areas for soil conservation, clean air and water, wildlife habitat, outdoor recreation, and aesthetics. The forest products industry is the largest employer in Allegany and Garrett Counties and the second largest employer on the Eastern Shore.



Forest Health Monitoring

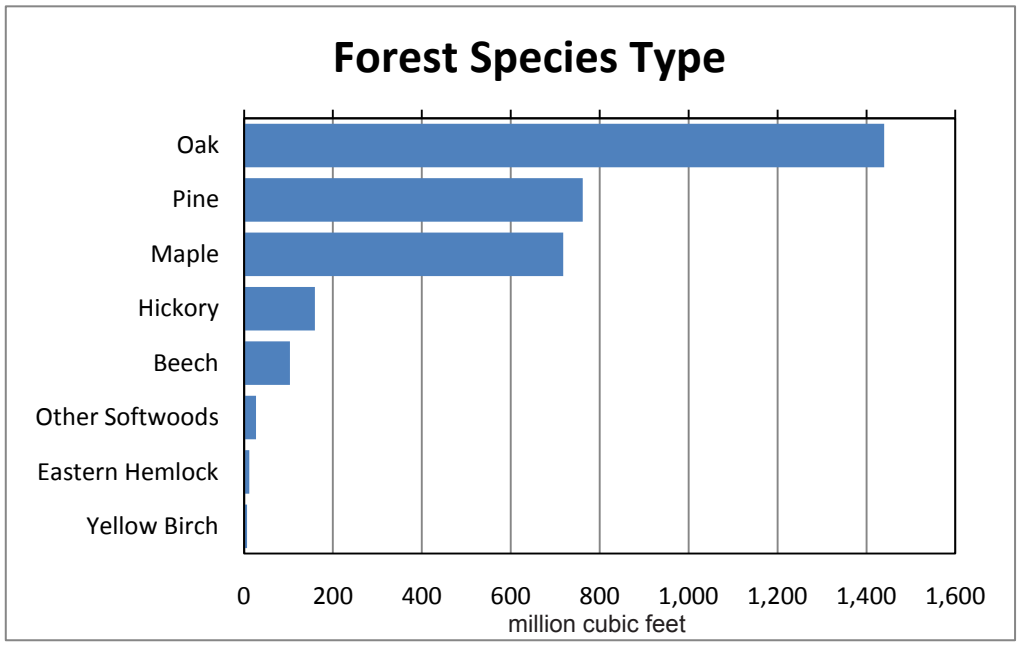
The national Forest Health Monitoring (FHM) Program has two components: plot network and off-plot survey. The U.S. Forest Service Northern Research Station's Forest Inventory and Analysis staff administers

(continued on page 2)



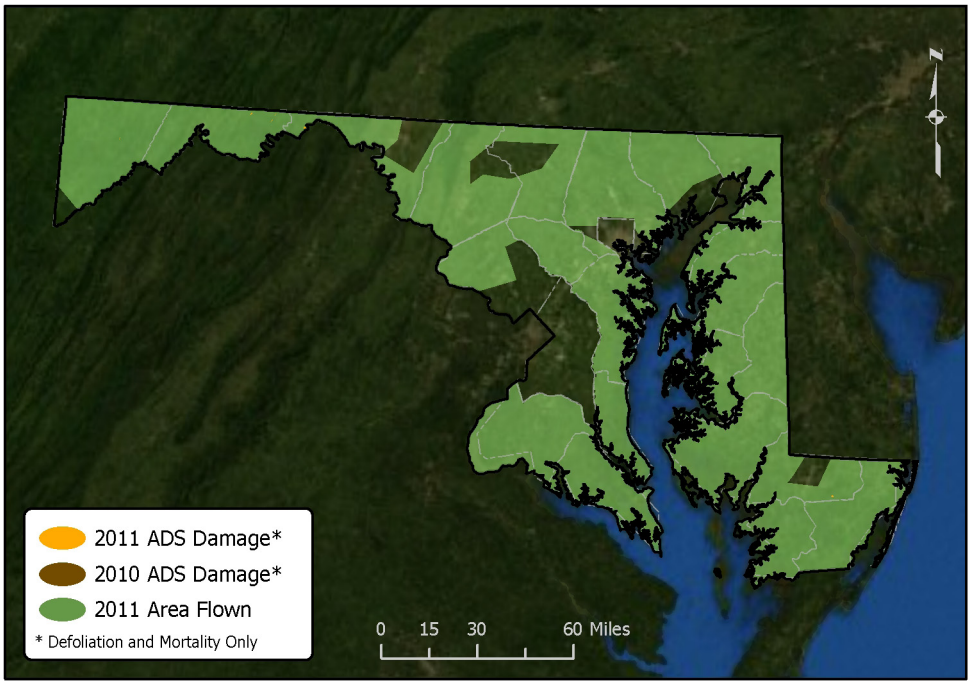
Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.



Aerial Surveys

Of the acreage flown in the 2011 aerial detection survey in Maryland, 1,845 acres of damage were recorded. The majority (927 acres) were damaged by hail. Locust leafminer damaged approximately 322 acres, the walkingstick damaged 246 acres, and wildfire caused 159 acres of damage.



This map delineates aerial detection survey (ADS) results for Maryland in 2011 and 2010.

Forest Health Monitoring *(continued from page 1)*

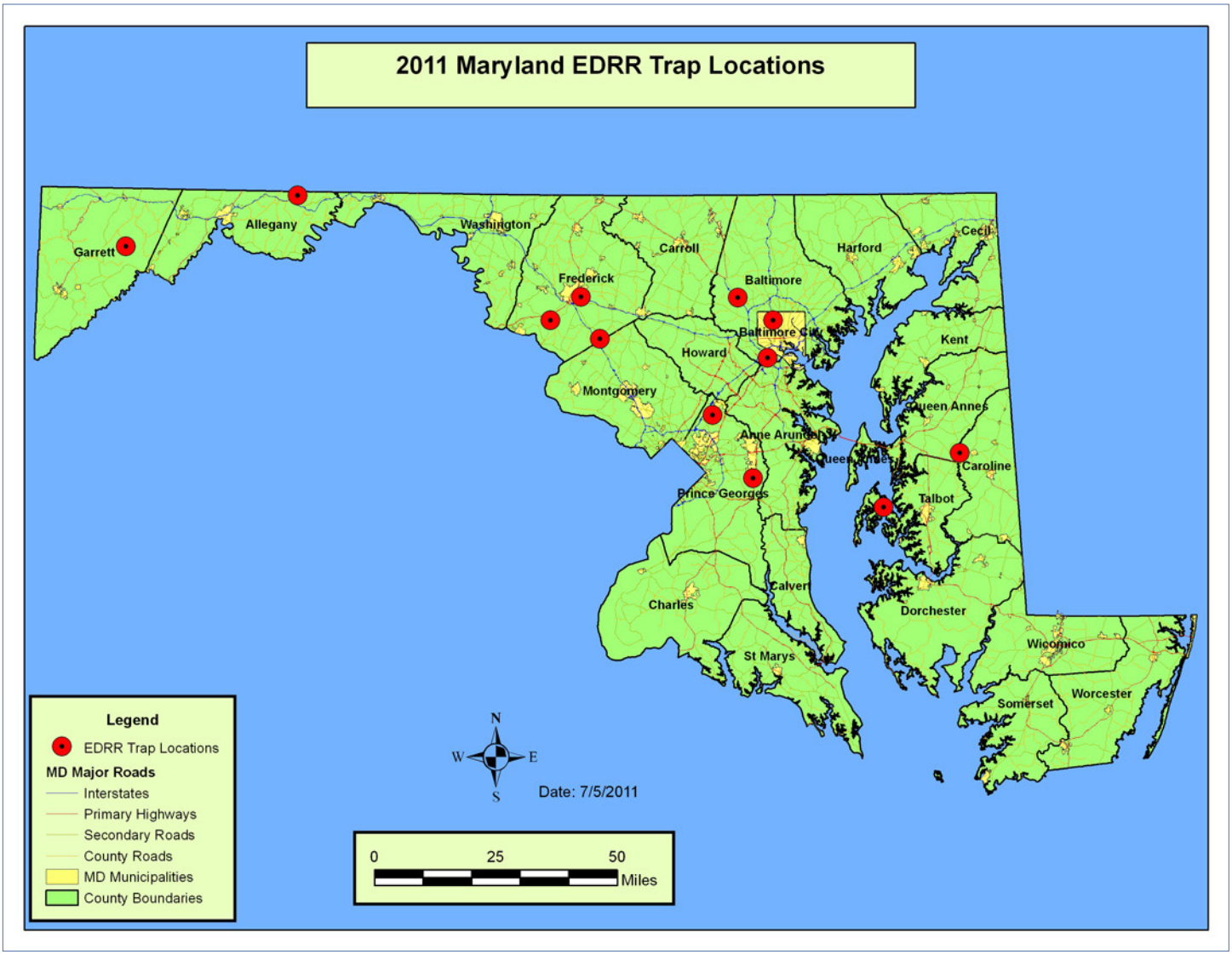
the plot network in Maryland. The plot network is designed to annually monitor, assess, and report on changes in the long-term condition of trees, soils, lichens, and air quality in forests.

The Maryland Department of Agriculture conducts the off-plot survey component of FHM. The objectives of the [Maryland] FHM Program are to delimit, map, and report forest pest problems as a supplement to the national FHM plot network. Aerial and ground surveys, data collection, and reporting are conducted in accordance with FHM standards for air operations and GIS.

Office of Plant Industries and Pest Management
Forest Pest Management Section

Detection and Evaluation Surveys
Early Detection Rapid Response

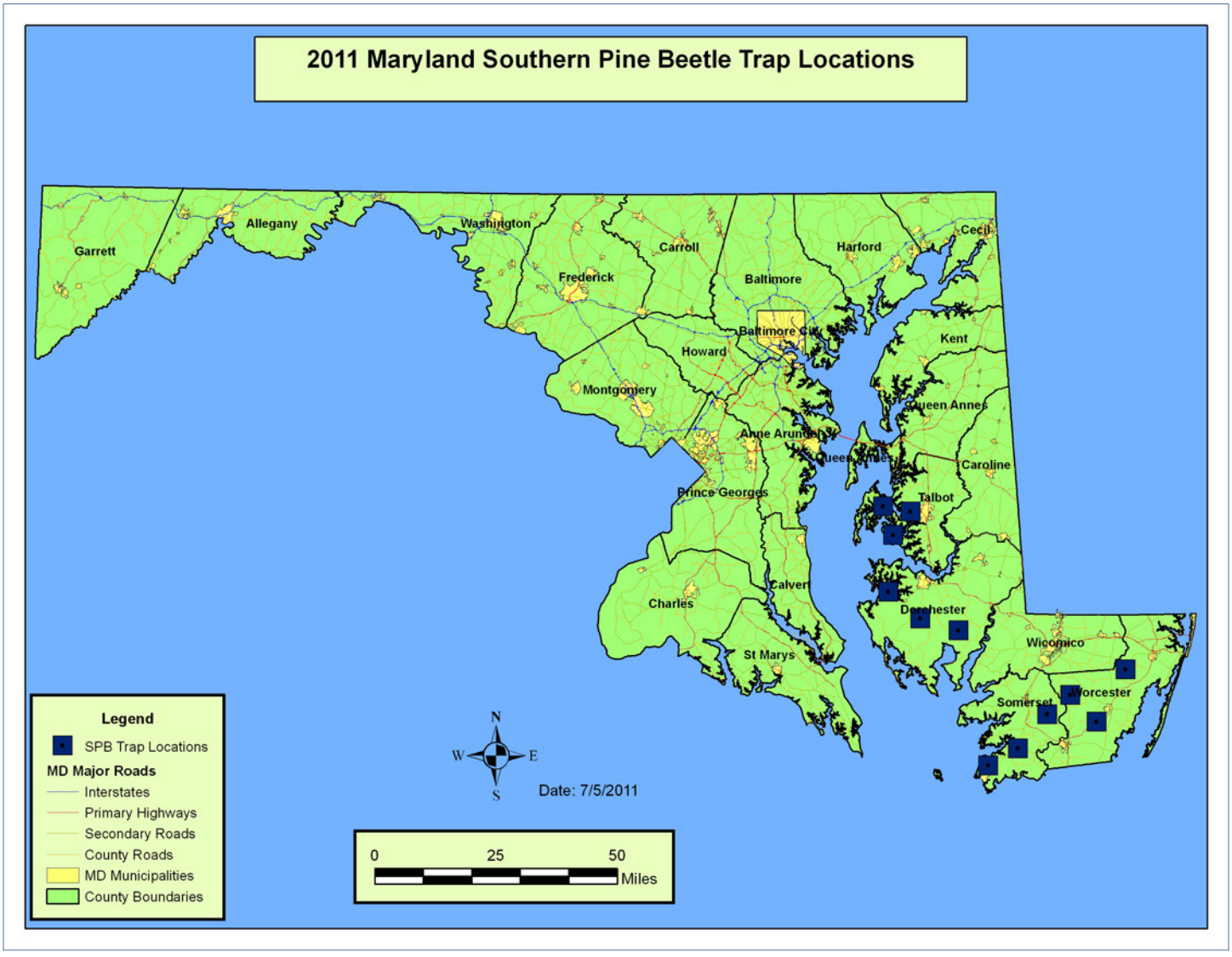
Every 4 years, the U.S. Forest Service asks the Maryland Department of Agriculture (MDA) to place traps for bark beetles in forested areas for the Early Detection Rapid Response program. This survey detects bark beetle species not previously known to exist in the United States. Twelve trap sites were distributed among the counties of Allegany, Frederick, Baltimore, Talbot, Caroline, Prince Georges, and Garrett as well as Baltimore City. Each site had three Lindgren funnel traps, each baited with a different lure. The traps were checked every 2 weeks for 12 weeks from April to June. The MDA collected 7,942 bark beetles (16 of which were exotic, with one new State record) and identified 120 species.



2011 Maryland EDRR Trap Locations.

Southern Pine Beetle

The southern pine beetle (SPB) is one of the most destructive insect pests of pines. Maryland is at the northern edge of its range, and SPB is commonly found on the lower Eastern Shore and in southern Maryland. Since 1989, Maryland has participated in a multistate SPB survey conducted throughout the Southern United States using pheromone-baited traps. Trap data indicated that SPB numbers would continue to remain low in 2011. Populations have been below outbreak levels since 1994. The three sites that were detected in 2010—two sites in Kent County and one in Talbot County—have collapsed.

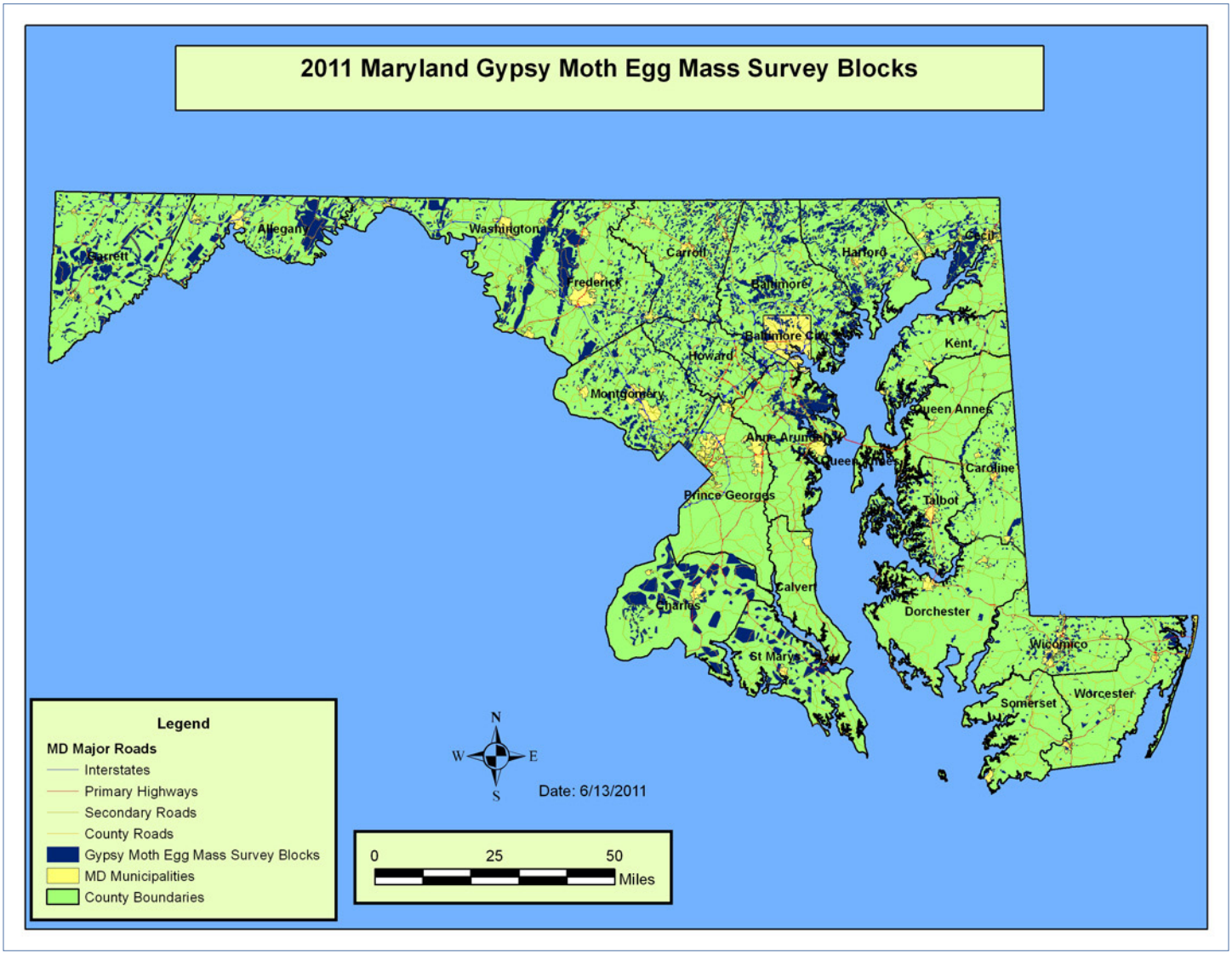


2011 Maryland Southern Pine Beetle Trap Locations.

Gypsy Moth

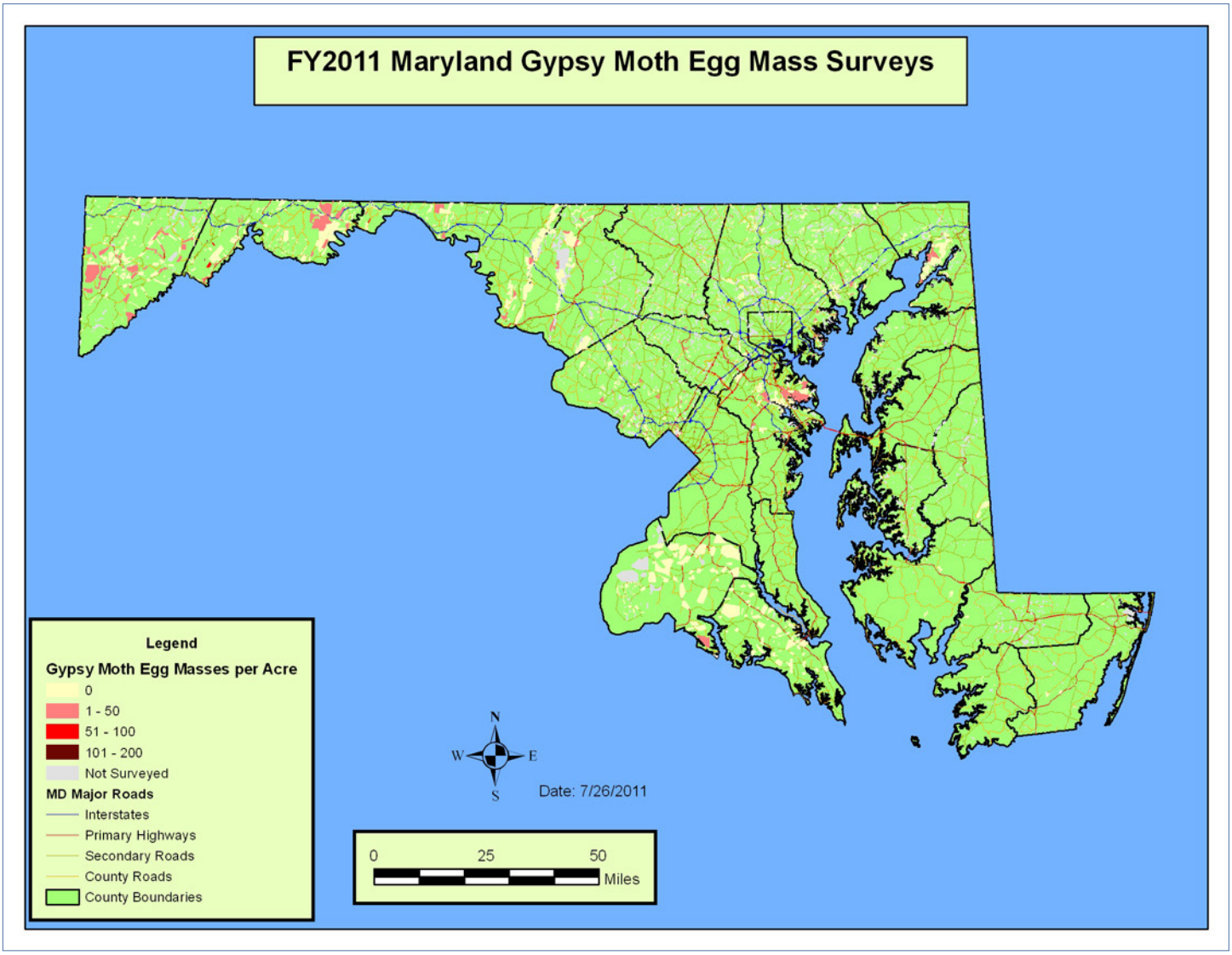
The gypsy moth is the most serious threat to oak forests in the United States. The first eggs were detected in Maryland in 1971 and the first extensive defoliation occurred in 1981. Each fall and winter, the MDA conducts an extensive survey for gypsy moth egg masses to determine potential areas of defoliation. The MDA surveyed 426,679 acres in the fall and winter of 2010-2011. This survey indicated that gypsy moth populations were low and there was no need for a State gypsy moth spray program in spring 2011.

The map below depicts all of the MDA's egg mass survey areas. Each area is surveyed at least once every 4 years.



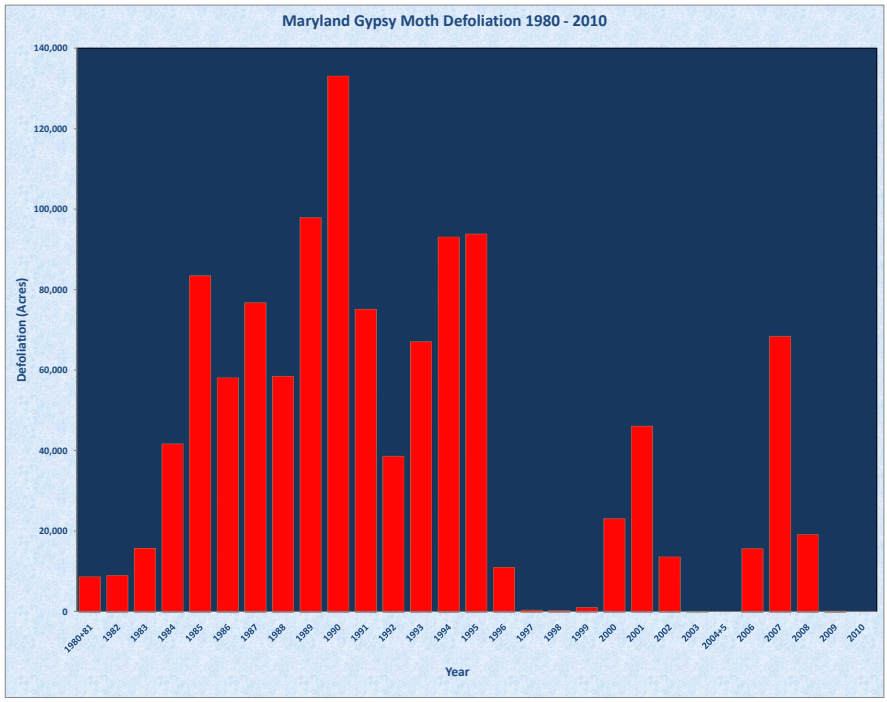
2011 Maryland Gypsy Moth Egg Mass Survey Blocks.

The map below depicts the results of the gypsy moth egg mass surveys.

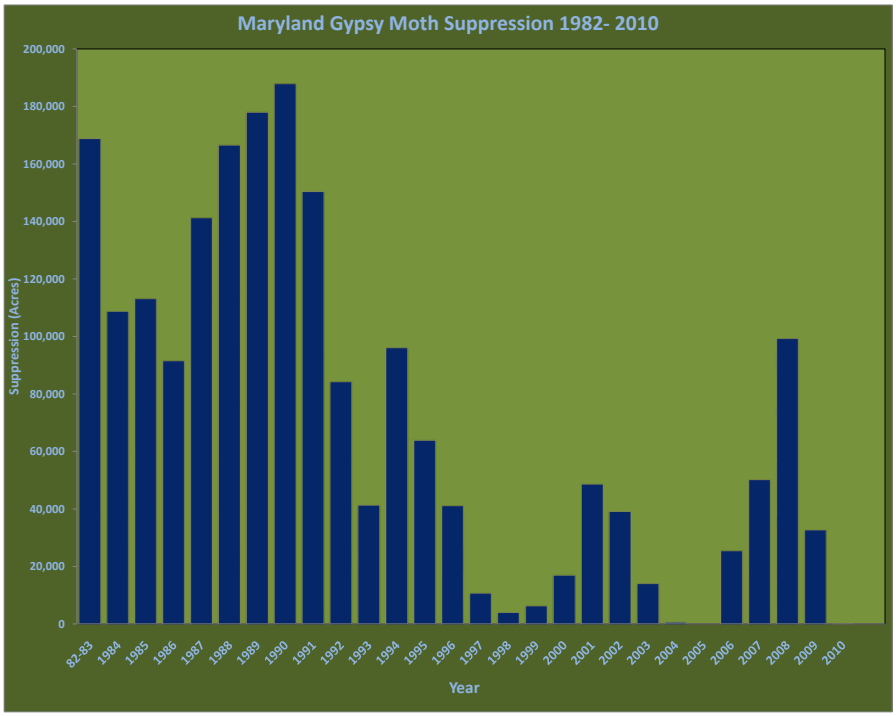


2011 Maryland Gypsy Moth Egg Mass Surveys.

Gypsy Moth: Historical Defoliation and Suppression



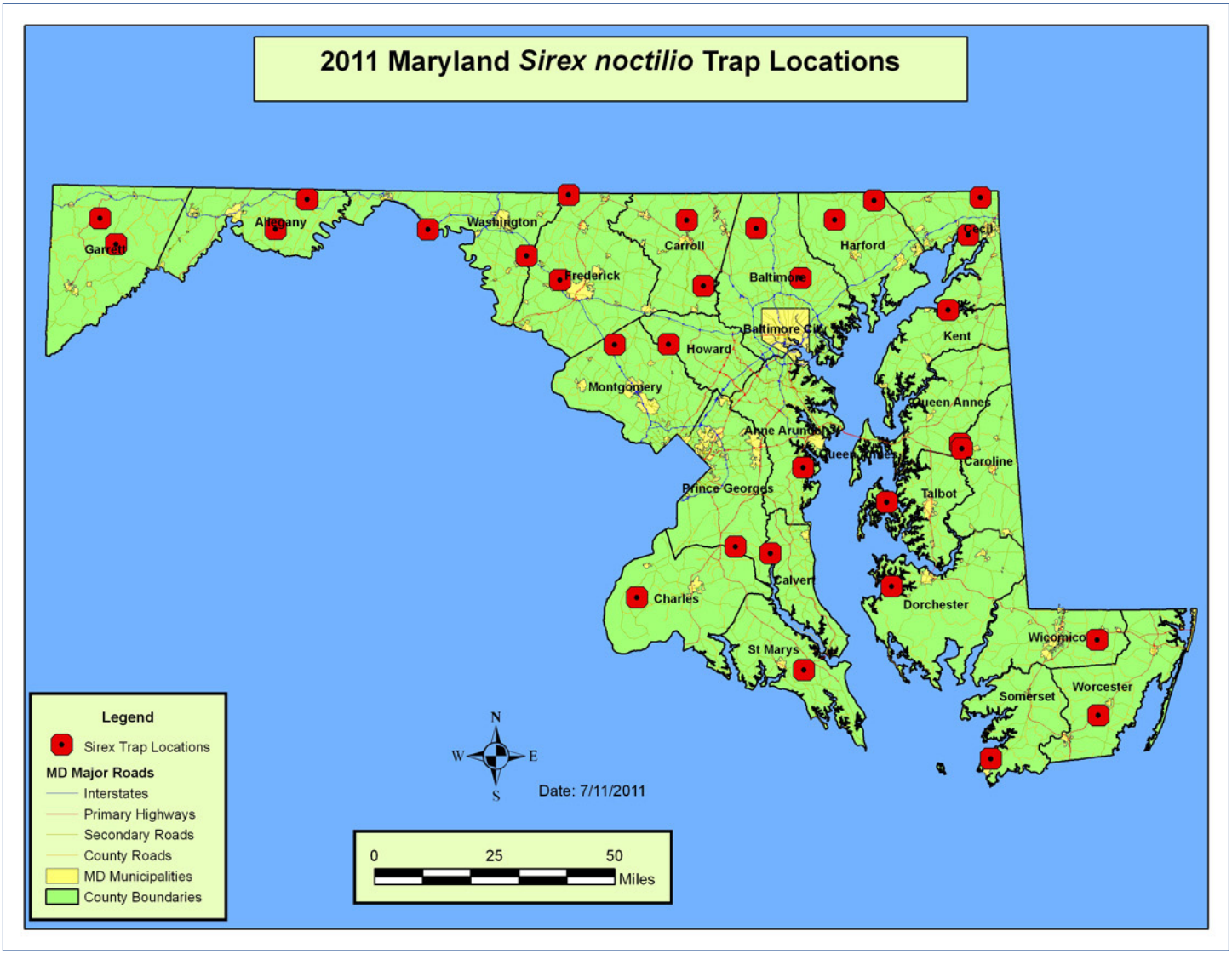
Maryland Gypsy Moth Defoliation 1980 – 2010.



Maryland Gypsy Moth Suppression 1982 - 2010.

Sirex noctilio (Wood Wasp)

Sirex woodwasp has been the most common species of exotic woodwasp detected at United States ports-of-entry associated with solid wood packing materials. Recent detections of this woodwasp outside of port areas in the United States have raised concerns because this insect has the potential to cause significant mortality of pines. The Sirex woodwasp has not been detected in Maryland but is known to be in Pennsylvania. To detect this insect, the MDA placed two traps per county in the northern tier counties and one trap in all other counties, for a total of 30 traps placed in pine woods. All traps were negative during FY2011.

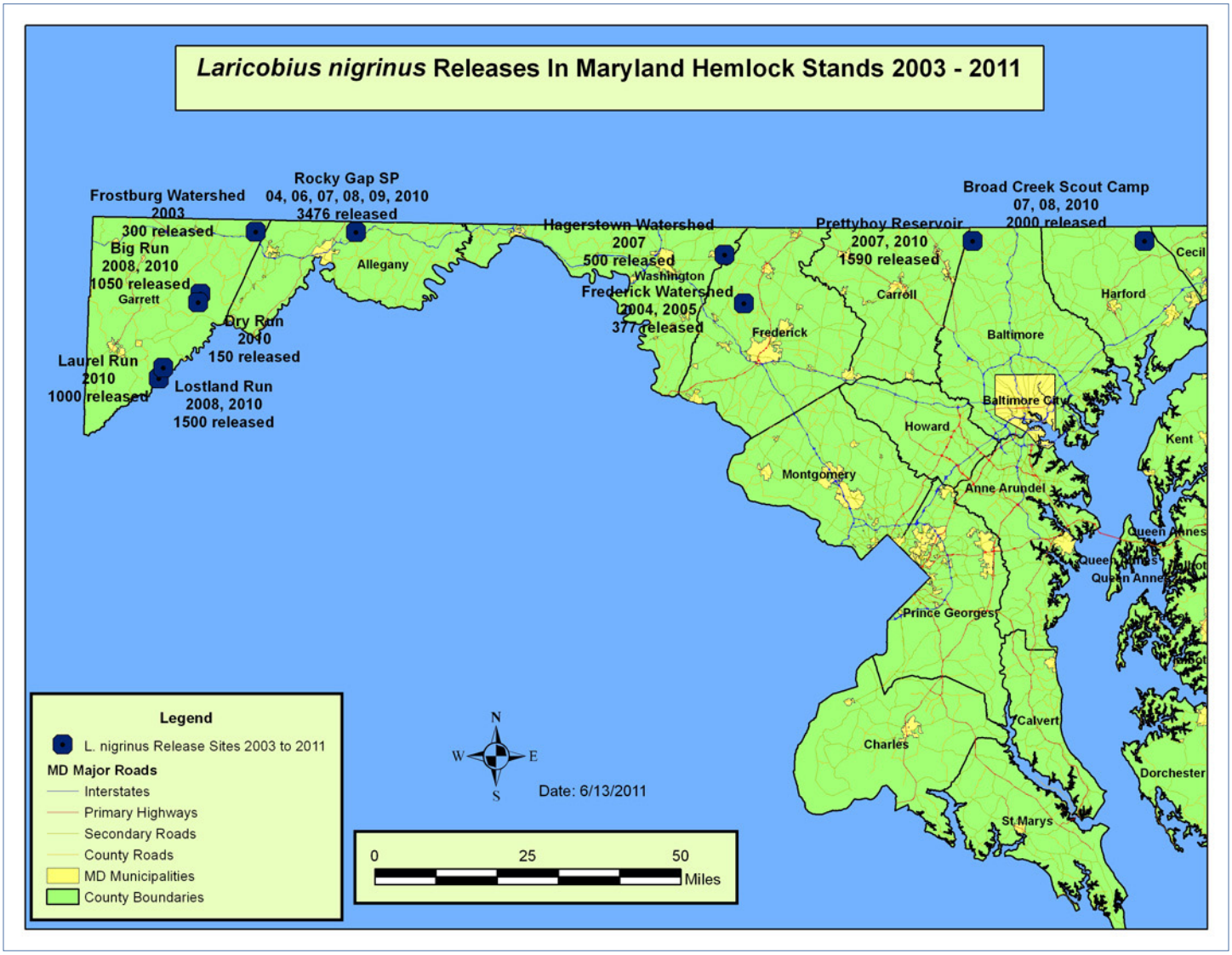


2011 Maryland Sirex noctilio *Trap Locations.*

Hemlock Woolly Adelgid: Surveys and Monitoring

Hemlock woolly adelgid (HWA) remains the major threat to the health of eastern hemlock. Infested hemlocks occur in the metropolitan area between Baltimore and Washington and in natural stands from Harford to Garrett Counties. As part of a Mid-Atlantic multistate survey, the MDA has set up 13 plots in six counties to assess the HWA impact on hemlock stands. Comparing 1998 plot data and 2009-2010 plot data, the number of hemlocks with a vigor rating of "healthy" decreased 96 percent; the number of hemlocks still alive decreased by 24 percent.

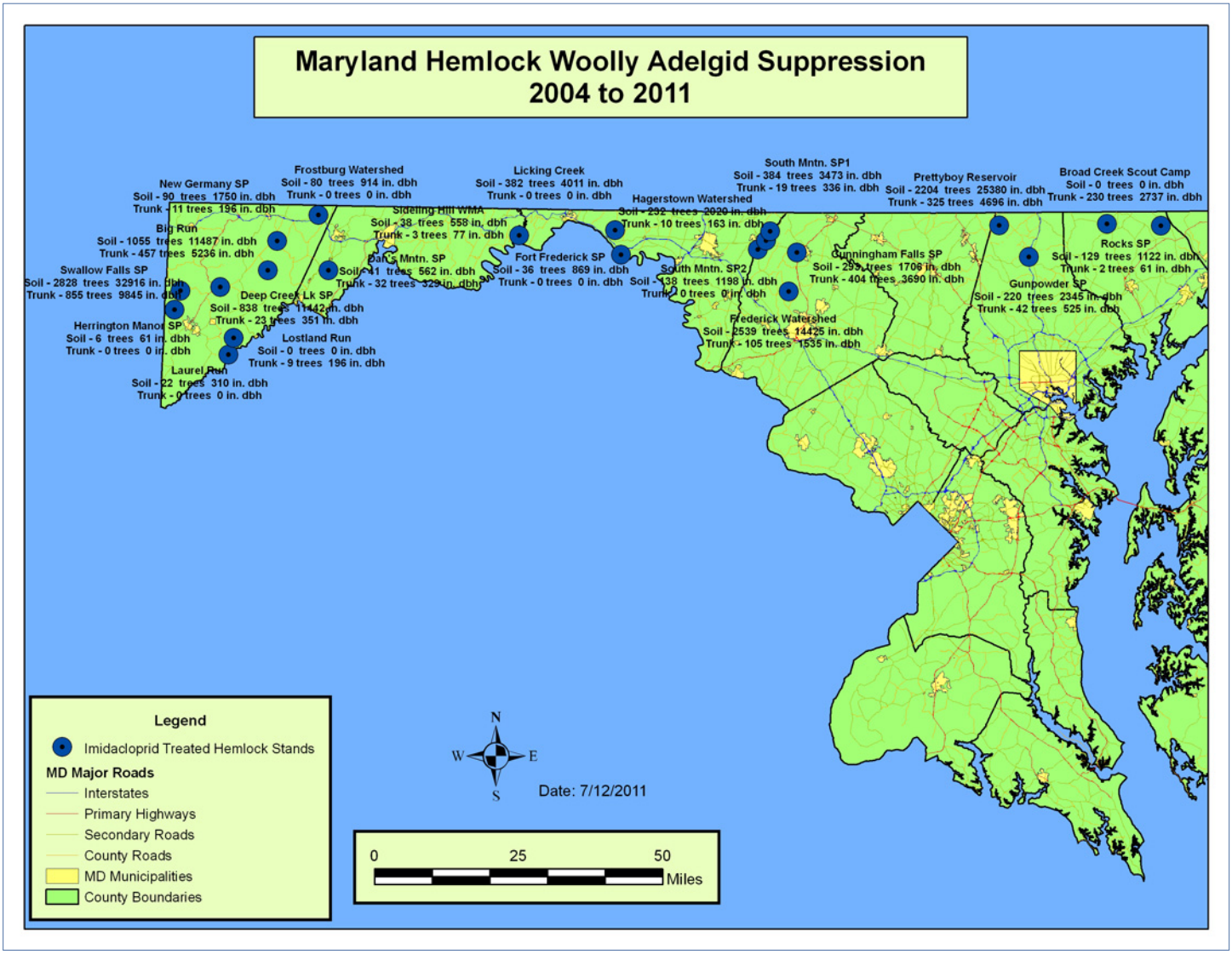
Laricobius nigrinus, a predatory beetle of the hemlock woolly adelgid, has been released in several areas since 2004. In FY2011, the MDA released 2,200 beetles in four areas of Garrett County, 1,000 in Harford County, and 1,090 in Baltimore County, for a total of 4,290 beetles. Two hundred of these beetles were collected from our "nursery" in Rocky Gap State Park. It is hoped that the MDA will be able to collect 1,000 beetles this fall (2011) for release in other areas of Maryland.



Laricobius nigrinus *Releases in Maryland Hemlock Stands 2003 - 2011.*

Hemlock Woolly Adelgid: Suppression

A joint MDA-Department of Natural Resources task force addressed the multidisciplinary needs of the HWA infestation. The task force prioritized more than 50 hemlock stands and selected them as the sites where suppression might be attempted. Only publicly owned sites would be part of this suppression project. For the first time, HWA was detected in Swallow Falls State Park, which has the preeminent old growth hemlock stand in Maryland. As a result of this detection, MDA-Forest Pest Management (FPM) and the Maryland Department of Natural Resources-Park Service undertook a suppression exercise to treat 3,680 hemlocks in the spring 2011. For the rest of the State, MDA-FPM treated 5,402 hemlocks.


Maryland Hemlock Woolly Adelgid Suppression
2004 to 2011
New Germany SP
Soil - 90 trees 1750 in. dbh
Trunk - 11 trees 196 in. dbh
Frostburg Watershed
Soil - 80 trees 914 in. dbh
Trunk - 0 trees 0 in. dbh
Licking Creek
Soil - 382 trees 4011 in. dbh
Trunk - 0 trees 0 in. dbh
South Mntn. SP1
Soil - 384 trees 3473 in. dbh
Trunk - 19 trees 336 in. dbh
Prettyboy Reservoir
Soil - 2204 trees 25380 in. dbh
Trunk - 325 trees 4696 in. dbh
Broad Creek Scout Camp
Soil - 0 trees 0 in. dbh
Trunk - 230 trees 2737 in. dbh
Sideling Hill WMA
Soil - 38 trees 558 in. dbh
Trunk - 3 trees 77 in. dbh
Hagerstown Watershed
Soil - 232 trees 2020 in. dbh
Trunk - 10 trees 163 in. dbh
Big Run
Soil - 1055 trees 11487 in. dbh
Trunk - 457 trees 5236 in. dbh
Rocks SP
Soil - 129 trees 1122 in. dbh
Trunk - 2 trees 61 in. dbh
Swallow Falls SP
Soil - 2828 trees 32916 in. dbh
Trunk - 855 trees 9845 in. dbh
Dans Mntn. SP
Soil - 41 trees 562 in. dbh
Trunk - 32 trees 329 in. dbh
Fort Frederick SP
Soil - 36 trees 869 in. dbh
Trunk - 0 trees 0 in. dbh
South Mntn. SP2
Soil - 138 trees 1198 in. dbh
Trunk - 0 trees 0 in. dbh
Cunningham Falls SP
Soil - 293 trees 1706 in. dbh
Trunk - 404 trees 3690 in. dbh
Gunpowder SP
Soil - 220 trees 2345 in. dbh
Trunk - 42 trees 525 in. dbh
Deep Creek Lk SP
Soil - 838 trees 11442 in. dbh
Trunk - 23 trees 351 in. dbh
Herrington Manor SP
Soil - 6 trees 61 in. dbh
Trunk - 0 trees 0 in. dbh
Lostland Run
Soil - 0 trees 0 in. dbh
Trunk - 9 trees 196 in. dbh
Laurel Run
Soil - 22 trees 310 in. dbh
Trunk - 0 trees 0 in. dbh
Frederick Watershed
Soil - 2539 trees 14425 in. dbh
Trunk - 105 trees 1535 in. dbh
Legend
Imidacloprid Treated Hemlock Stands
MD Major Roads
Interstates
Primary Highways
Secondary Roads
County Roads
MD Municipalities
County Boundaries
N
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0
25
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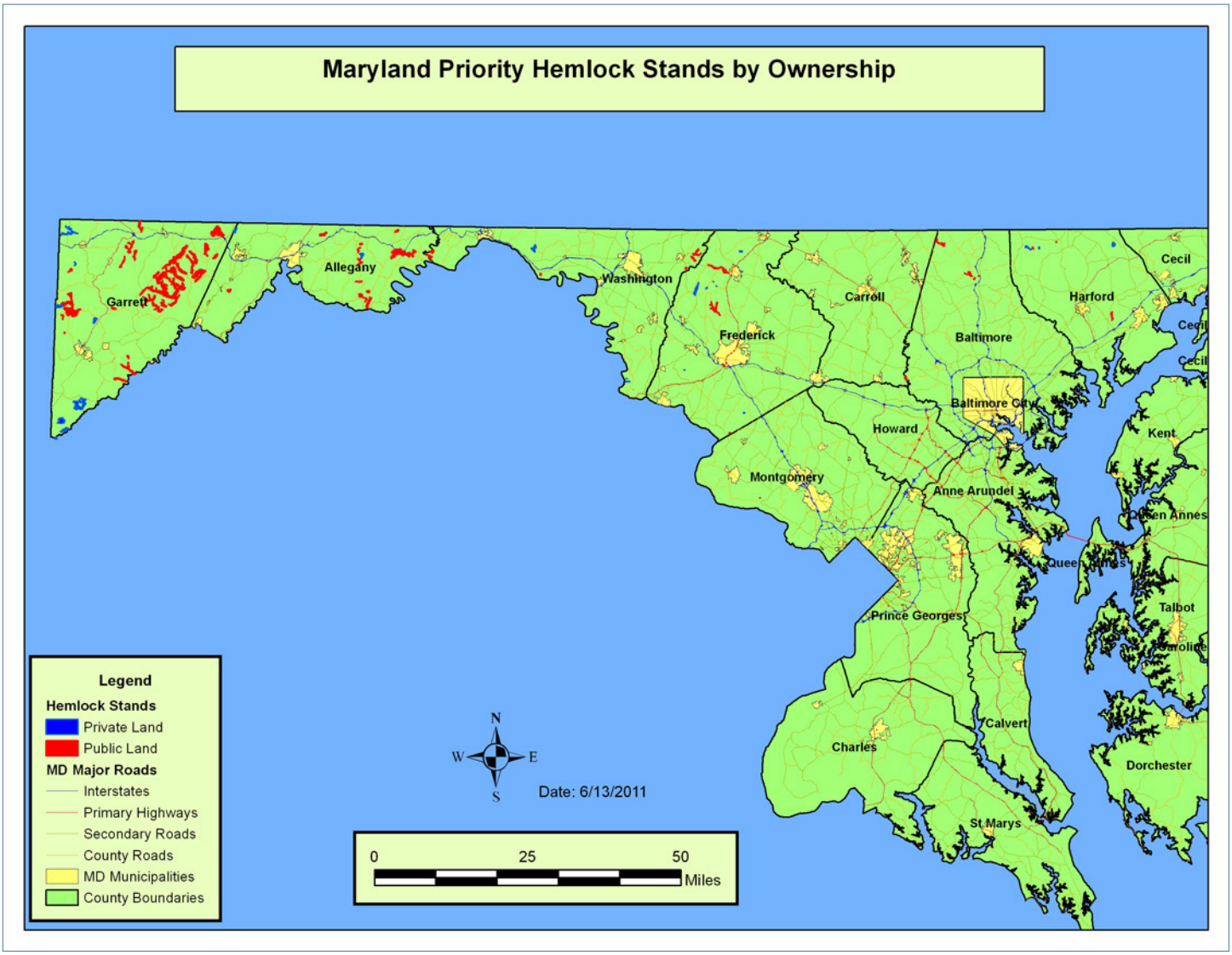
Maryland Hemlock Woolly Adelgid Suppression 2004 to 2011.



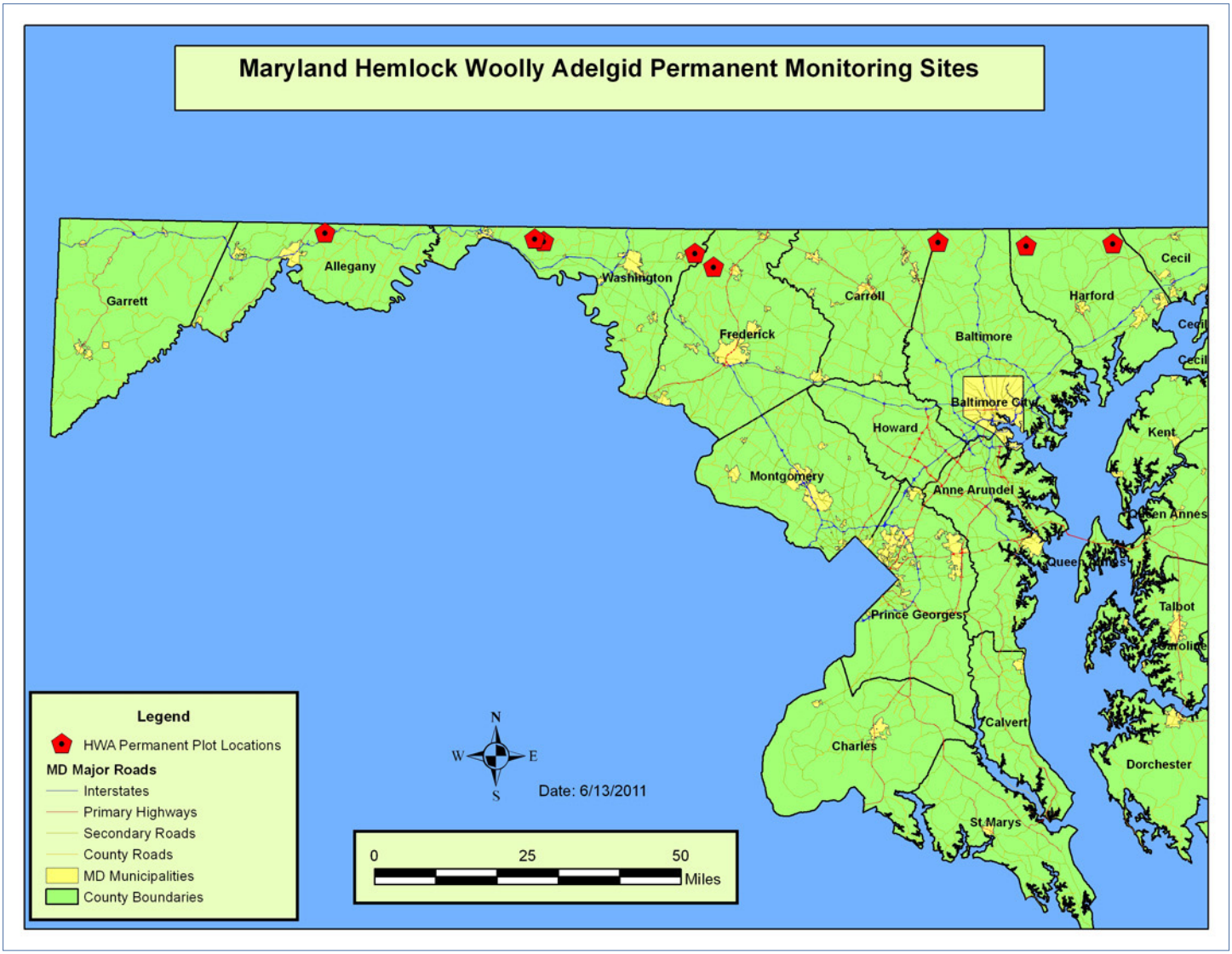
Maryland Priority Hemlock Stands by Ownership.

FY2011 Imidacloprid Treatments for Hemlock Woolly Adelgid in Maryland

Hemlock Stand	County	Trunk Injection		Soil Injection		Total	
		# Trees	Inches d.b.h.[1]	# Trees	Inches d.b.h.[1]	# Trees	Inches d.b.h.[1]
Savage River SF (Big Run)	Garrett	115	1,197	548	5,176	663	6,373
Big Run SP	Garrett	329	3,785	507	6,312	836	10,097
Cunningham Falls SP	Frederick	361	3,181	39	269	400	3,450
Frederick Watershed	Frederick	–	–	1,725	9,833	1,725	9,833
Broad Creek	Harford	94	996	–	–	94	996
Rocks SP (Kilgore Falls)	Harford	2	61	129	1,122	131	1,183
Frostburg Watershed	Garrett	–	–	80	914	80	914
Prettyboy Reservoir	Baltimore	–	–	910	12,158	910	12,158
Dan's Mountain SP	Allegany	32	328	41	562	73	890
Deep Creek Lake SP	Garrett	20	293	470	6,571	490	6,864
Swallow Falls SP	Garrett	855	9,845	2,825	32,881	3,680	42,726
Total		**1,808**	**19,686**	**7,274**	**75,798**	**9,082**	**95,484**

[1] d.b.h. = the diameter of the tree trunk at 4.5 feet above the ground.

Hemlock Woolly Adelgid: Permanent Plot Monitoring



Maryland Hemlock Woolly Adelgid Permanent Monitoring Sites.

Five to eight hemlock sites with HWA were evaluated for change in tree health from data collected since 1998. The data indicated a decline of these trees. Data results include these:

- Live crown ratio[1] decreased 57 percent from 73 percent to 31 percent (data from 5 sites)
- Crown density[1] decreased 28 percent from 48 percent to 35 percent (data from 5 sites)
- Dieback increased from 3 percent to 33 percent (data from 5 sites)
- Transparency stayed nearly constant at 39 percent and 42 percent (data from 5 sites)
- Percentage of trees with a vigor rating of healthy decreased from 89 percent to 4 percent (data from 8 sites)
- Percentage of dead trees increased from 1 percent to 32 percent (data from 8 sites)

[1] Includes trees that have died (value = 0)

Hemlock Woolly Adelgid: Suppression Efficacy

Eleven hemlock stands have been evaluated for efficacy of hemlock woolly adelgid suppression soil treatments with the insecticide imidacloprid. Seven stands were evaluated in 2006, two stands were evaluated in 2010, and two stands were evaluated in 2011. On average, treated trees had a 57 percent reduction in HWA populations when measured 1 year post treatment, and nontreated trees averaged a 47 percent increase in HWA populations when measured over the same time period. Measurements were based on five treated hemlock trees and five untreated hemlock trees per site with HWA counted on two to four 30cm branch tips per tree.

Additionally, measurements of the health of treated and untreated trees were made over a 6-year period (2005-2011). A small sample of previously infested hemlocks (10 trees) was treated with imidacloprid in the spring of 2005 at Broad Creek Scout Camp in Harford County and data was recorded on the health of the trees. Twenty untreated trees at the same Broad Creek Scout Camp also had data recorded. Comparing the treated and untreated trees after 6 years, the live crown ratio decreased by 20 to 21 percent in both. Crown density increased by 10 percent in the treated trees and decreased by 15 percent in the untreated trees. Treated trees had a 25 percent decrease in dieback while the untreated trees had a 52 percent increase. Treated trees had a 15 percent reduction in transparency while the untreated trees had a 66 percent increase. Additionally, the number of treated trees with a vigor rating of "healthy" or only "light decline" increased by 29 percent while decreasing by 64 percent in the untreated trees.

Casual Pest Surveys

A number of surveys for forest pests were conducted, including surveys prompted by landowner requests for information. The results are described in the following section.

Emerald Ash Borer

No emerald ash borers were found during visual surveys at 72 ash tree sites in 10 counties.

Southern Pine Beetle

Visual surveys were made for the southern pine beetle at three sites in Kent and Talbot Counties; two of the sites were positive and the third was negative.

Little Leaf Disease

Little leaf disease is a disease of short leaf pine. A check of short leaf pine at the Pocomoke River State Forest (Worcester) revealed the presence of little leaf disease. This site had been positive in the past.

Cerceris

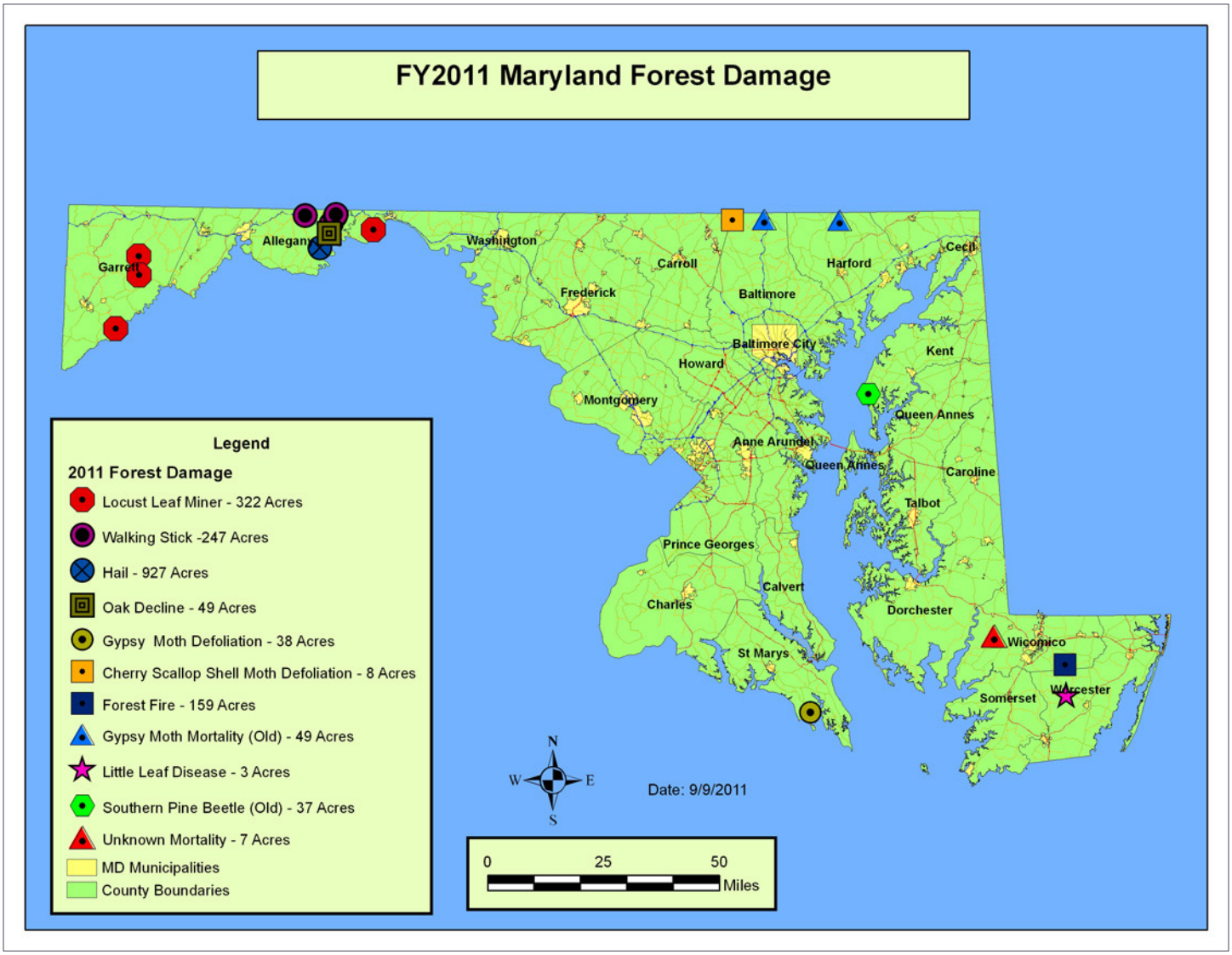
Cerceris is a predatory wasp of borers, which includes the emerald ash borer. It can be used as a survey tool for the emerald ash borer. Thirty-two inspections in Frederick, Washington, Montgomery, and Prince George's Counties resulted in one positive Cerceris find in Prince George's County; all others were negative.

Other

A small amount of damage was observed by walnut caterpillar on pecan, catalpa sphinx on catalpa, and orange striped oakworm on red oak. Other observations include these:

Damage Agent	Tree Species	Number of observations
Oak decline	Oaks	4
Cedar apple rust	Apple	2
Hemlock woolly adelgid	Hemlock	3
Eastern tent caterpillar	–	1
Fall webworm	–	1
Bagworms	–	1
Anthracnose	Maple	1
Possible oak wilt/bacterial leaf scorch	Red oak	1
Abiotic factors	Pine and oaks	2
Unknown	Oak	6
Unknown	Pine	2
Gypsy moth	Blue spruce	1

Forest Pest Damage



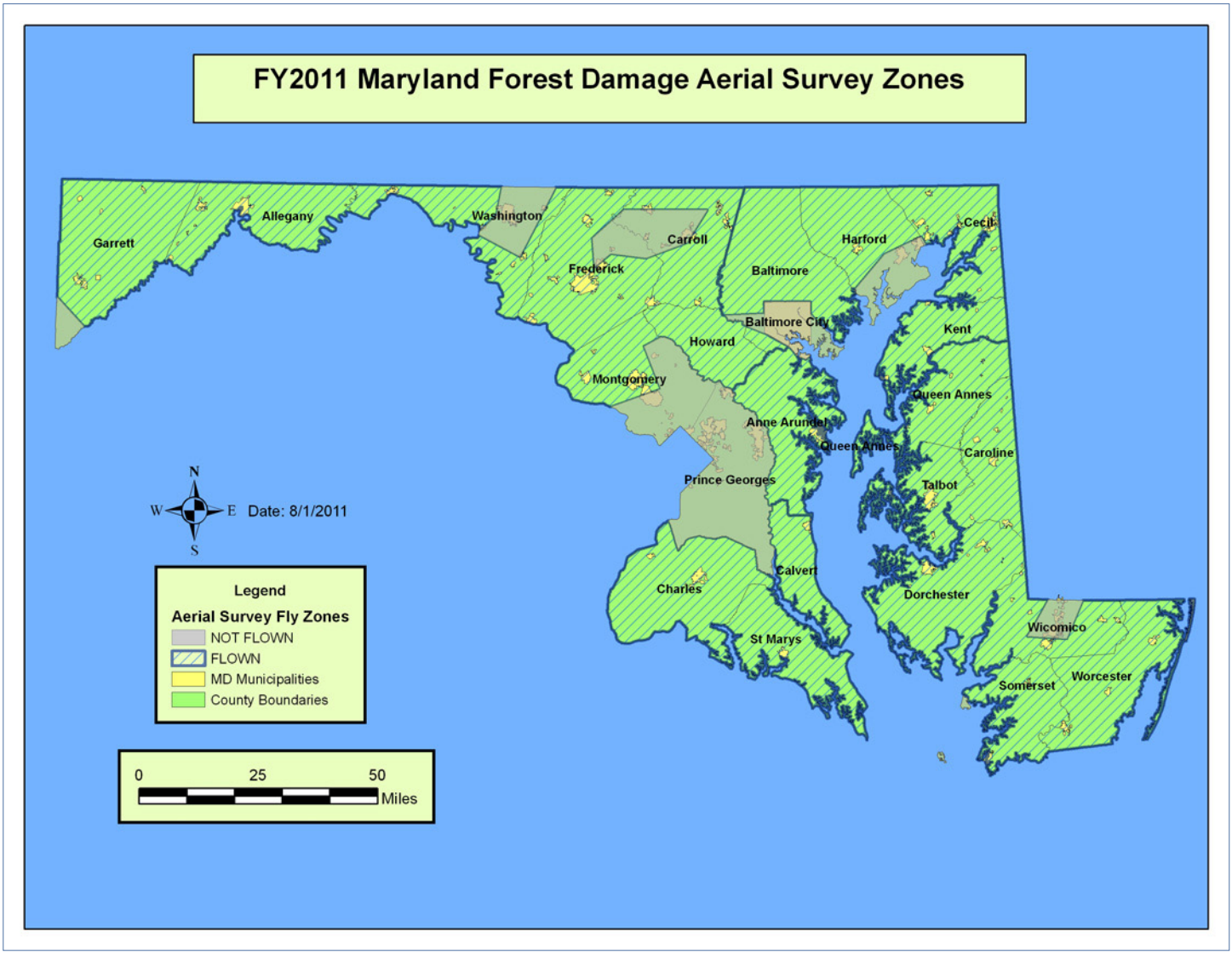
FY2011 Maryland Forest Damage.

2011 Maryland Forest Damage (August 18, 2011)

Damage Causal Agent	Host	Number of Acres
Locust leafminer damage	Black locust	322
Forest wildfire damage	Mixed species	159
Gypsy moth mortality (previously unreported)	Oak	49
Gypsy moth defoliation	Oak	38
Southern pine beetle mortality (previously unreported)	Loblolly pine	37
Little leaf disease	Short leaf pine	3
Cherry scallop shell moth defoliation	Cherry	8
Hail damage	Central hardwoods	1,130
Oak decline	Oak	49
Unknown mortality	Loblolly pine	7
Total		**1,802**

2011 Aerial Survey Damage Assessment

Almost the entire State is flown to map any damage done to the forests of Maryland. It took 11 flight days between June 15, 2011, and August 11, 2011, and 26.3 hours of flight time to cover 5,538,718 acres.



FY2011 Maryland Forest Damage Aerial Survey Zones.

References

Land Cover Map:
U.S. Geological Survey. 2011. 2006 National land cover dataset. Sioux Falls, SD.

Forest Land Ownership, Forest Species Type:
U.S. Department of Agriculture, Forest Service. 2009. Forest resources of the United States, 2007. Gen. Tech. Rep. WO–78. Washington, DC. 336 p.

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March 2012

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